

Final Report  
Climate & Health: Evaluating Climate-based Models  
for Predicting Patterns of Tick Borne Disease  
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Summary

Soil moisture is a critical component of many surface-atmosphere interactions. It also may play an important role in the spatial and temporal distribution of various infectious diseases by serving as a critical determinant of habitat suitability for disease vectors which are often insects and other arthropods.

As measuring soil moisture has traditionally proven time consuming and costly, methods of accurate estimation from easier-to-obtain surrogate information, such as climate data, are highly desirable. Accordingly, we developed a method for estimating soil moisture in forested areas using linear regression techniques. Active climate factors from the Thornthwaite-Mather climatic water budget served as dependent variables, and gravimetrically determined soil sample weights served as independent variables.

The model was developed using samples collected during summer, 1999 at random sites across Rhode Island, and was validated using samples taken in summer, 2000 at additional random sites across the state. The model proved highly reliable with  $R^2=0.94$  for the model and  $R^2=0.96$  for the validation. The soil moisture model developed will become an integral part of a vector-borne disease warning system for health officials and the public.

[Key words: soil moisture, climatology, water budget.]